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CASE REPORT

Advantages of the open approach in sinonasal tract tumors with midfacial and suprastructure invasion

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ABSTRACT

BACKGROUND. In case of rhinosinusal malignant tumors, it is important to have a unified and simple terminology. The suprastructure refers to the ethmoid sinus, the sphenoid sinus, the frontal sinus and the olfactory area of the nose. The mesostructure includes the maxillary sinus, excepting the orbital wall, and the respiratory part of the nose.

MATERIAL AND METHODS. We will present two clinical cases admitted and surgically treated in our department. The first one is a left-side suprastructure mass in a 39-year-old male patient, with a particular evolution. The second one is a left-side midfacial and suprastructure tumor with 3 prior negative biopsies in a 57-year-old patient. In both cases, we performed an external surgical approach.

DISCUSSIONS. For an external approach in mesostructure malignant tumors, we propose a combined approach using lateral nasal rhinotomies, sub-labial rhinotomies and midfacial degloving. The external approach in malignant tumors of the suprastructure is centred on a classical incision for the frontal sinus or a hemicoronal or coronal approach. There are some clear advantages of the open approach to be considered.

CONCLUSION. The advantages of the external approach are represented by a direct visualization and control of the tumor during the ablative time; a better control for negative margins; a better control of haemostasis; a better chance for en-bloc resection versus piece-meal resection.

KEYWORDS: malignant tumors, midfacial, suprastructure, external approach.

INTRODUCTION

Paranasal sinuses malignant tumors are relatively rare and very aggressive, leading to a diagnosis in advanced stages. In this chapter of head and neck oncology, there is a lack of efficient therapeutic protocols. The gold standard seems to be a combination between surgeries with external or endoscopic approach and radiotherapy. Due to advanced stages at the moment of diagnosis, the external approach seems to be more useful and safe[1-3].

When we are discussing about rhinosinusal malignant tumors, it is important to have a common and simple terminology. There are many classifications in use for these specific types of tumors, such as Ohngren's classification, Lederman's classification and the American Joint Cancer Committee (AJCC) classification. The first one classified the rhinosinusal tumors in relation to the Ohngren's line, which is an imaginary plane between the medial canthus of the eye and the angle of the mandible. The suprastructure is situated superior to this plane and the infrastructure is located inferior to this plane.

In Lederman's classification, there are used two horizontal lines of Sebileau through the orbits' floors and the base of the piriform aperture. Consequently, we can identify the supra, meso and infrastructure, with a poorer prognosis for the tumors arising from suprastructure compared to the infrastructure invasion. The suprastructure refers to the ethmoid sinus, the sphenoid sinus, the frontal sinus and the olfactory area of the nose. The mesostructure includes the maxillary sinus, excepting the orbital wall, and the respiratory part of the nose. This is the rarest form of rhinosinusal malignant tumors. The

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Figure 1. Cranio-facial CT scan showing a left suprastructure tumor with lysis in the left orbital ceiling and left exophthalmia.

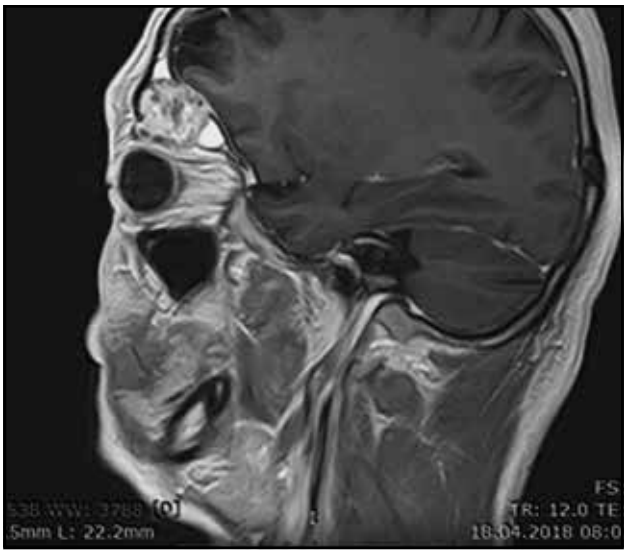

Figure 2. Cerebral MRI showing the contact of the left frontal sinus tumor with the dura mater of the frontal lobe.

infrastructure refers to the gingival mucosa of the alveolar process.

The AJCC classification is the most used because it is a TNM staging classification.

From our point of view, the Lederman classification seems more useful in clinical and surgical approach[4-7].

The external approach for malignant tumors with invasion of the midface and suprastructure involves both an ablative and a reconstructive time. The ablative time should be ideally radical with clear margins; neck dissection is a necessity because metastatic adenopathy is described in 10% of squamous cell carcinomas and in 4% of the adenocarcinomas. The reconstructive time has to minimize aesthetic and functional damages. In mesostructure malignant tumors, we use lateral nasal rhinotomies, such as Sebileau-Moure, Hautant, Weber-Ferguson Dieffenbach and sub-labial rhinotomies like Denker-Rouge and midfacial degloving. Each of these approaches offers a special access point to the tumor and depends on the tumor size, location and extension, as well as on the surgeon experience to choose an approach over another. The external approach in malignant tumors of the suprastructure begins with the classic approach for the frontal sinus or a hemicoronal or coronal approach. Neck dissection is of great importance for the outcome of the patient[8-10].

The endoscopic surgery is reserved for small tumors; the improvement of instrumentation and neuronavigation systems allows resection in safe conditions. It is recommended that the endonasal approach should be

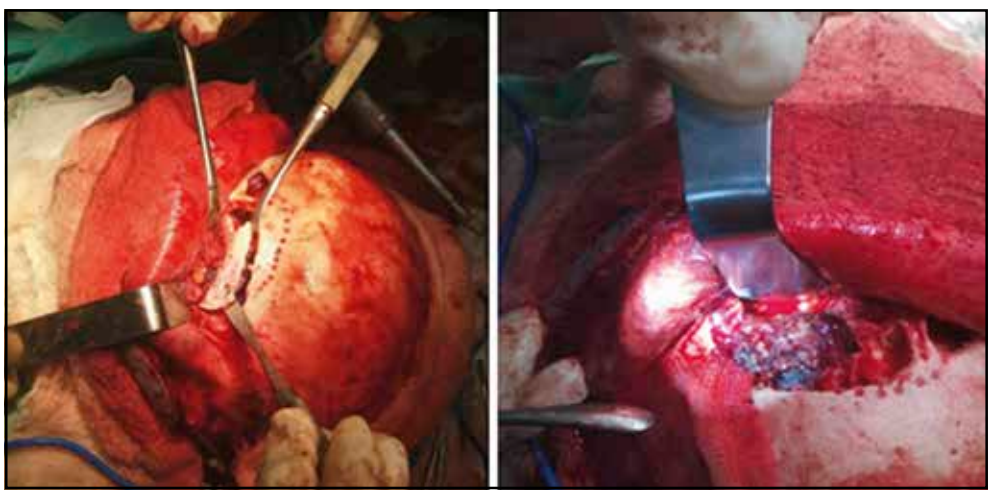

Figure 3. Intraoperative aspects – coronal approach with frontal osteotomies and radical ablation of the tumor.

performed by teams already experienced in skull base and endonasal surgery. Maybe the endoscopic control of rhinosinusal malignant tumors is the future, but there are still limits imposed by adequate equipment and endoscopic competence[11-13].

CASE REPORTS

The first case is a 39-year-old male patient, with a right-side suprastructure (involvement of the frontal and ethmoidal sinuses) tumor operated 3 years ago by external approach, Ogston-Luc type. The histopathologic result was salivary type rhinosinusal carcinoma. The patient underwent adjuvant chemoradiotherapy, but with a delay 12 weeks after surgery. He was monitored every 3 months, with cranio-facial MRI every 6 months and the evolution was without relapse. After 3 years, the patient accused a "black spot" in the visual field of the left eye and left exophthalmia. The cranio-facial CT scan revealed a tumoral mass with left frontal, ethmoidal and orbital invasion and a postoperative status on the right side. Furthermore, the CT scan described a lysis of the left orbital ceiling with displacement of the left eye towards the inferior and lateral structures (Figure 1). Also, it associated invasion into the posterior wall of the left frontal sinus and an extradural extension of the tumor. We gathered further data using cerebral MRI, which showed the contact of the tumor with the frontal lobe dura without its apparent invasion (Figure 2).

We decided to perform a coronal approach with frontal osteotomies, which allowed radical ablation of the suprastructure tumor. The origin of the tumor seemed to be from a lateral plane, near the lacrimal gland. Fortunately, we found no tumor on the right side (Figure 3). Because there was no cerebrospinal fluid leak, we decided not to use a titanium mesh in order not to interfere with radiotherapy. The patient had a rapid surgical healing with no significant aesthetic deficit. The histopathologic result was adenocarcinoma. The patient underwent a supplement of adjuvant radiotherapy on the left side. Unfortunately, 6 months later we discovered a unique right pulmonary metastasis which was operated and received chemotherapy. After another 6 months, the patient presented with permeation nodules in the right frontal and left temporal regions. The patient is still in oncologic therapy at this moment.

The second clinical case is a 55-year-old male patient with left meso and suprastructure tumor invasion (rhino-maxillo-ethmoidal) with a history of 3 prior negative biopsies. Clinically, the patient presented with left recurrent epistaxis and left infraorbital neuralgia and anaesthesia. It was a patient with tumor exteriorization to the left nostril (Figure 4). The cranio-facial CT scan revealed a huge rhinosinusal mass extension, in contact with the anterior skull base and left genial exteriorization (Figure 5).

We performed angiography with preoperative embolization of the left internal maxillary artery (Figure 6). Because of the genial extension, we decided to perform an external Weber-Ferguson-Dieffenbach approach with radical ablation of the tumor. We conserved an infraorbital arch and the buccal fat pad for the reconstruction of the maxillary (Figure 7). The postoperative evolution was without aesthetic and significant functional deficits, with a conserved motility of the left eye and a slight lagophthalmy (Figure 8). The patient underwent adjuvant chemoradiotherapy and he was monitored every 3 months and performed a cranio-facial CT scan every 6 months. After 24 months he presented no relapse.

Figure 4. Left rhinosinusal tumor (midface and suprastructure) with exteriorization to the left nostril.

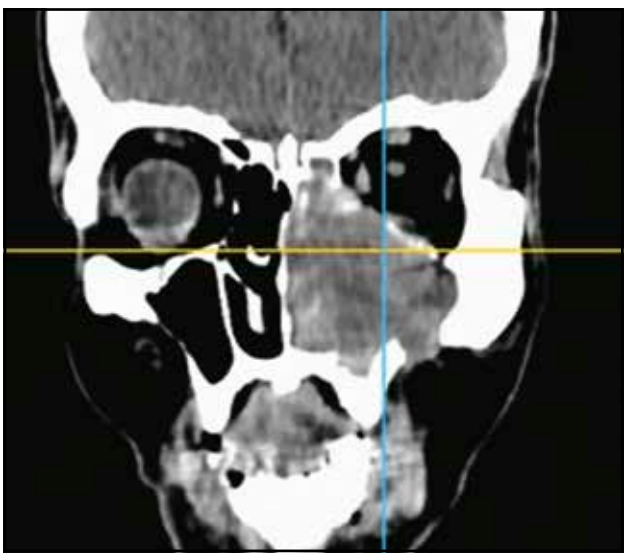

Figure 5. CT scan showing huge left midface and suprastructure tumor with lysis into the left orbital floor and in the maxillo-zygomatic pillar.

Figure 6. Angiography with preoperative embolization of left internal maxillary artery.

DISCUSSIONS

There are some advantages of the external approach in case of midface and suprastructure malignant tumors invasion: direct visualization and control of the tumor during the ablative time; a better control for negative margins; a better control of haemostasis; a better chance for *en-bloc* resection versus piece-meal resection. The *en-bloc* resection is possible also in endoscopic approach, but with a higher risk for spreading the tumor, being limited by the use of only basic surgical instruments, except the micromotor with drill. The disadvantages of the external approach are the scars, the facial deformity, and facial palsy on frontal or zygomatic branch of the facial nerve, the residual trismus; one should take into consideration the fact that it is a time-consuming surgical procedure. Also, a low rate of intra and early post-surgery complications were described. The majority of the patients suffer from chronic crusting rhinitis, epiphora and sensory loss in the ophthalmic or infraorbital territories after rhinotomies. Following the French Society of ENT (Société Française d'Oto-Rhino-Laryngologie - SFORL) 2008 guidelines, the follow-up must consist in clinical examination every two months for the first year, every three months for the second year, then every six months for life; MRI every three months after treatment, then determined by clinical examination, and chest X-ray at 6 months followed by once a year[14-16].

We consider that there are some keys for surgical success, such as high-performance imaging equipment, permanent endoscopic control during surgery, histopathology with frozen sections availability, a combined and trained therapeutic team and last but not least, a compliant patient. The prognosis factors are TNM staging at the initial diagnosis, tumor type, negative surgical margins and availability of adjuvant oncologic therapy like intensity modulated radiation therapy (IMRT). Despite of therapeutic methods progress, the prognosis in meso and suprastructure tumors is still very poor, with local recurrence in 38% of cases and a 5-year overall survival rate of only 63%. A survival improvement has been observed for cases combining surgery and radiotherapy[17-20].

CONCLUSIONS

In midface and suprastructure tumors, a correct surgical planning for the external approach is essential. There are some advantages of the external approach: direct visualization and control of the tumor during the ablative

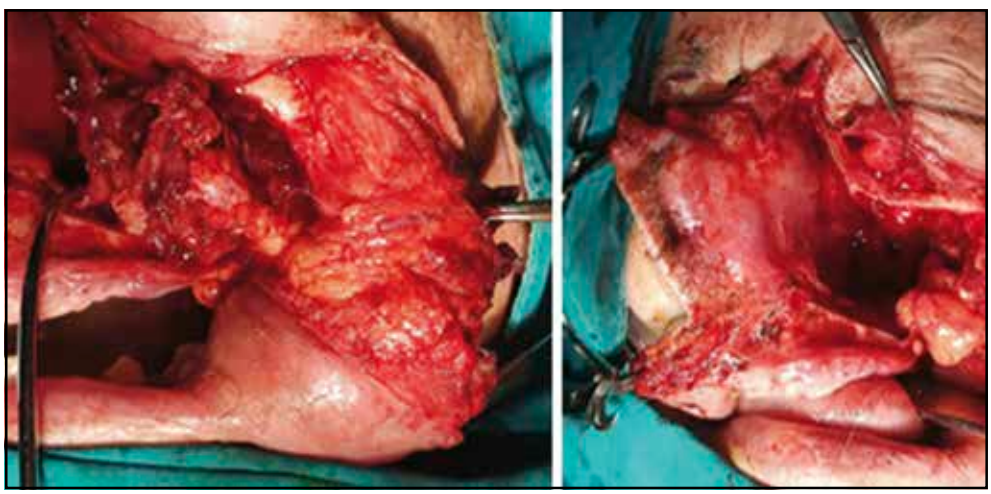

Figure 7. Intraoperative aspects – Weber-Ferguson-Dieffenbach approach with radical ablation of the tumor (partial resection of left midface and suprastructure).

Figure 8. Postoperative aspect.

time; a better control for negative margins; a better control of haemostasis; a better chance for *en-bloc* resection versus piece-meal resection. The main therapeutic aims are malignant tumor ablation and negative margins. The complete control of haemostasis is essential and preoperative embolization may be useful. The reconstructive time of the external approach has to minimize the functional and aesthetic deficits. It is also very important to have the informed consent of the patient about real therapeutic alternatives. An experienced team and a multidisciplinary approach can lead to a better result.

Conflict of interests: The authors declare no conflict of interests.

Contribution of authors: All authors have equally contributed to this work**.**

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